eBusiness: The Next Generation

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Ref: *The B2B E-commerce Revolution: Convergence, Chaos, and Holistic Computing*, in Information System Engineering: State of the Art and Research Themes, S. Brinkkemper, E. Lindencrona, and A. Sølvberg (eds.), Springer-Verlag Ltd., London. June 2000.

Outline

- Conclusions
- The Irreversible Information Revolution
- Business and Technology Convergence
- The Big Picture
- What's Going on in eBusiness?
- Lessons Learned
- Conclusions

Conclusions: Its Just Beginning

- 2001-2002: eBusiness becomes an integral part of Business
- 2005: Information Utility appears, Internet disappears
- Broad-based revolution: every industry at different times (5-20 years) and degrees based on process innovation
- Classic Bubbles
  - Consolidation: the Tortoise Vs. the Hare
  - Hyper growth about to start
- Continuous evolution and change

The Irreversible Information Revolution

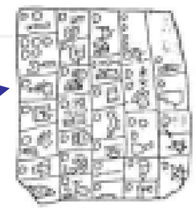
The Fourth Information Revolution

eBusiness Is Fundamental and Irreversible

Role and Significance of Information

The 3rd Industrial Revolution

- Information Revolutions
  - 1st: c. 4,000 BCE - writing, Mesopotamia
  - 2nd: c.1300 BCE - book, China (Greece c.500 BC)
  - 3rd: 1450–1455 - printing press, Gutenberg
  - 4th: c. 2000 - information technology, Web



- 3rd Industrial Revolution
  - British 1750-1830 - steam
  - American 1880-1940 - mass production, electricity, ...
  - Automation / Information 1946 - ?
- Impacts
  - Economic
  - Business
  - Technical
  - Cultural
  - Social
  - Religious

Technology-based Revolution Trends

- Industrial Revolution
  - Trigger: steam engine
  - Change: ways business is conducted
  - Convergence: technologies, businesses
  - Chaos: while business processes in flux
  - Period: 80 years
  - Characteristics: broad-based innovation/re-invention, power shifts,
  - Economic boom: "routinization"**
  - Major impacts: unanticipated/profound: factories, cities, working class, ...
- Automation / Information Revolution
  - Computer + Internet
  - same
  - same
  - same
  - same; 5-20 years to go
  - same
  - same
  - same: ?
- eBusiness: new processes

* Growth Economics, Prof. Paul Romer, Stanford

**Drucker PF. Beyond the Information Revolution

Automation / Information (+ Internet)

- Oil
  - 3-D acoustical sounding increased hit rate from 5% to 65%
  - Cost of a barrel of oil from $30 to $9 in 5 years
- Autos:
  - eBiz will eliminate $2-3K / car
  - Fuel cell eliminate 90% demand for hydrocarbons
- Cut flowers grown in 3rd world, managed from Holland
- Warfare: "Ultra-Power" - reliance on electronics
- Music: e-distribution may eliminate the $100-200 BN/year industry
- E-Government: tax filing
- Protected by regulation
  - Liquor sales
  - Real estate
  - Auto sales
  - Stock trading: reduce 6 hand-offs to 1

eBiz Is Fundamental and Irreversible

- Past IT non-"revolutions"**
  - Client/server, 4GL, PC, expert systems, distributed object computing, ERP
- Largest corporations committed to reinvention using the Internet
  - Ford, GM, Wal-Mart, Warner Lambert, Colgate-Palmolive
  - GM and GE attribute record 1999 sales and profits to Internet activities
  - GM cut $480 M in procurement in 2000; 50% of plastics biz on-line
  - Enron planned $40 BN in 2000 for energy contracts online, did $336 BN
  - 10% of airline tickets online @ cost of $5 for a $300 leisure-travel ticket
- B2B e-commerce predictions
  - 1999/2000: B2B revenues increase 189% from $145 BN to $433 BN [Gartner]
  - 2001: $919 BN [Gartner) / $550 BN (eMarketer)
  - 2002: $1.9 trillion - 66% of all business partly on Web
  - 2004: $2.7 / $6.2 (revised 2/01 from $7.29) trillion or 3 / 7% of global economy*
  - **2005**: $8.5 trillion
    - 25% of auto supply chain
    - 17% of energy trading
    - 20% of warehousing and shipping
    - 14% of pharmaceuticals and medical products
- IT contribute to US productivity 1995-99 - for the 1st time in history

** Silver Bullet Shy on Legacy Mountain

* Forrester / Gartner

Role and Significance of Information[1]

- The revolution is about economics and business, NOT technology, but …
- Pre-Internet: 5-10% of businesses automated
- By 2004: 20+%
  - Digitization required to be on the Internet
  - Increased automation
  - Transaction loads (e.g., 30 BN medical transactions/year)
- Current information technology inadequate
  - Capture, store, generate, search, analyze, and disseminate
  - Anticipated volumes and functions
- Information is an integral part of the revolution
  - "Information causes change. If it doesn't, it's not information" C. Shannon
  - Information is more than technology
  - Fuel or base currency

[1] Broadening the Database Field, VLDB2000

Business and Technology Convergence

Enterprise Integration
eBusiness Processes
eBusiness Economic Model

Business and Technology Convergence

- Convergence: synergistic coming together of people, ideas, or processes in novel ways
- Traditional processes
  - Centuries or decades - US home building supply chain c. World War II
  - Homeostasis: embedded power and structure
- Internet connectivity
  - Shift in balance of power from vendor to consumer
    - Increase customer value
    - Build deeper relationships with partners and customers
  - Efficiencies: reinvention imperative
    - DestroyYourBusiness.com, Jack Welch, GE CEO
    - Disruptive businesses and technologies*
- New business processes lead to new technology requirements

* Christensen CM. The Innovator's Dilemma: When New technologies Cause Great Firms to Fail, Harvard Business School Press, Boston, 1997

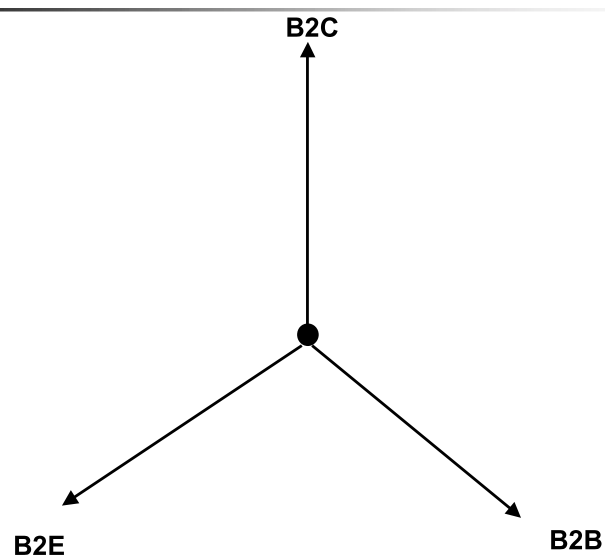
Enterprise Integration -> eBusiness

- Wave 1: Enterprise Resource Planning (ERP)
  - Back-office applications: finance, human resources, manufacturing/logistics
  - 60% of Fortune 1000 use ERP by 1998
  - $10 B/year
  - Contributions
    - Business partnership with technology
    - Technology
      - COTS
      - Process-orientation
- Wave 2: Strategic Enterprise Applications
  - Business Intelligence
  - Knowledge Management
  - Enterprise Performance Management
  - Customer Relationship Management
- Wave 3: eBusiness

eBusiness Evolution

Enterprise Integration	B2C + B2B eBusiness	eBusiness Collaboration
		
- Cost reduction and efficiency - Integration of business processes	- Effectiveness - Cooperation along the supply chain	- Value creation - Collaboration within business communities

eBusiness Spectrum



eBusiness Processes: Autos & Books

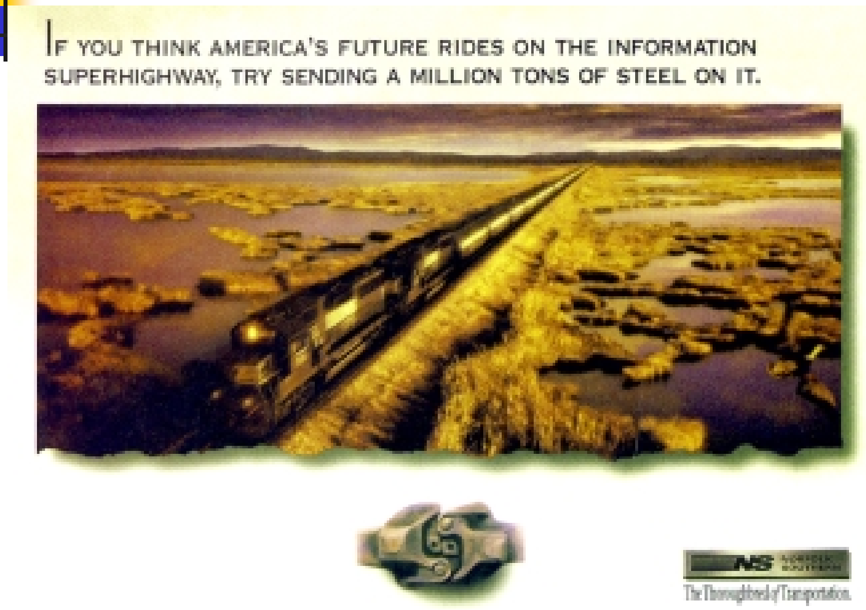
- B2B + B2E: Re-Inventing General Motors, project Yellowstone*
  - Web-based design, manufacturing, selling, and shipping cars
    - Build to stock → build to order c.f. Dell Computer
    - 3,000 parts → 30 modules
    - 8 weeks → 1-4 days
- B2C: Re-Inventing Retail - Amazon, retail revolutionary
  - From "One-click" book purchase - anywhere, anytime
  - To "Earth's Biggest Selection™ of products, including free electronic greeting cards, online auctions, and millions of books, CDs, videos, DVDs, toys and games, and electronics."
  - 29 M (was 13 M 12/00) customers, 160 countries
  - Constant refinements
    - Profiles, wish lists, new and used items, wireless access, collaborative filters (suggest products based on profiles)
    - Partners - drugstore.com, Ashford.com, eZiba.com, (Gear.com, HomeGrocer.com, Pets.com)

* On hold in USA due to UAW opposition

eBusiness Processes

- Technology
  - Computers
  - Computer services
  - Electronics and semiconductors
  - Internet / New Media
- Media
  - Advertising & marketing
  - Broadcast / cable
  - Education
  - Entertainment
  - Publishing
- Telecommunications
  - Telecom / Internet services
  - Provisioning
- Commercial Services
- Basic Industry
  - Aerospace
  - Logistics
  - Auto parts
  - Chemicals
  - Metals and mining
  - Paper and Forrest products
- Consumer
  - Apparel
  - Travel
  - Goods - books, electronics, groceries, drugs, pet supplies
- Energy
- Finance
- Health care

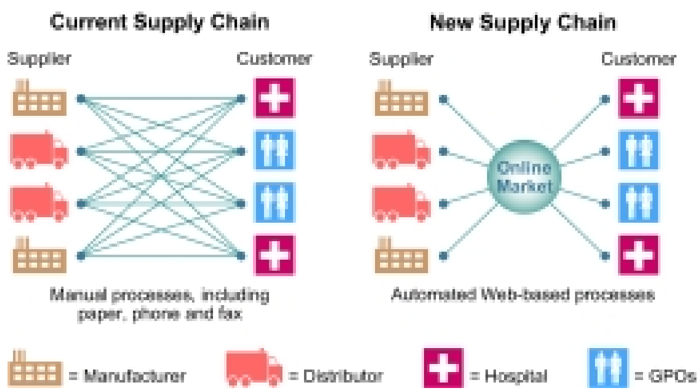
eBusiness Limits



Customer Relationship Management

- CRM evolution
  - Concept
    - Power shift to customers
    - Synchronization of all customer information resources (data + function)
  - CRM applications
    - Initially narrow: Sales Force Automation - Siebel Systems, Inc.
    - Then comprehensive: customer profiles, sales and marketing, campaign management, order entry, and customer service - Siebel, Vantive, Clarify
  - eRelationship Management - real-time, based on all interactions
    - Web-based CRM - BroadVision, SilkNet
- Lessons
  - Rapid evolution, demise of *new* new processes
  - Web-centric
  - Integral part of all eBusiness processes
  - CRM table stakes as competitors are a click away

E-Health Care Supply Chain



Marketplaces ...

- Banking
- Aerospace & Defense
- Engineering & Construction
- Real Estate
- Oil & Gas
- Utilities
- High Tech & Electronics
- Retail
- Health Care
- Consumer Products
- Automotive
- Public Sector
- Chemicals
- Telecommunications
- Media
- Business Information Warehouse
- Insurance
- Knowledge Management
- Pharmaceuticals

The Big Picture

The Challenge

Technology, Business, and Economics

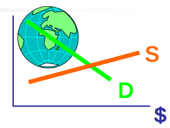
Next Generation Computing: Inertnet as Platform

The Challenge

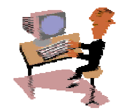
- Today's infrastructure technologies do not meet eBusiness requirements
  - Web-centric architectures and technologies will emerge
- Next generation requirements
  - Functional and operational requirements of next generation apps (e.g., eBusiness)
  - 5-20 years of Chaos and convergence
    - Amazon.com Whiplash: massive flux and change
    - Disruptive applications and technologies
    - Requirements of evolving business processes and models
    - Unanticipated results
  - Economics-pull: new economic models
- Big picture, industrial perspective
  - Holistic vs. Cartesian
  - Top-down vs. bottom-up
  - End-to-end solutions

The Big Picture

Economic Models

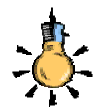


Business Models



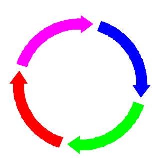
Processes

Technology

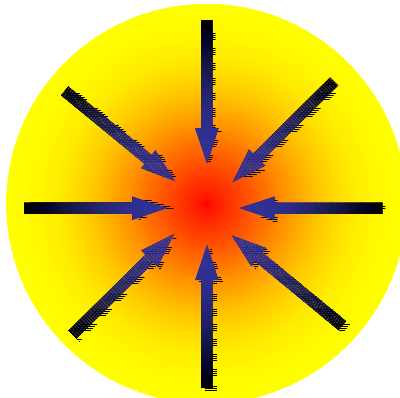


Convergence

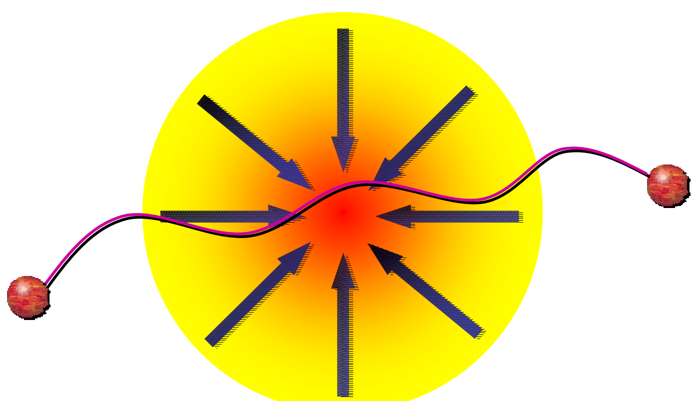
- Economic models enable business models enable technology models and *vice versa*
- New economic and business models
  - Initially manual
  - Acceptance leads to automation for competitive edge
  - Technology becomes “table stakes”
- Economic, business, and technology models evolve and converge
  - Computation models
  - Functional models: automate functions of individuals
  - Enterprise models: Enterprise Resource Planning (ERP)
  - Strategic models: Business Intelligence



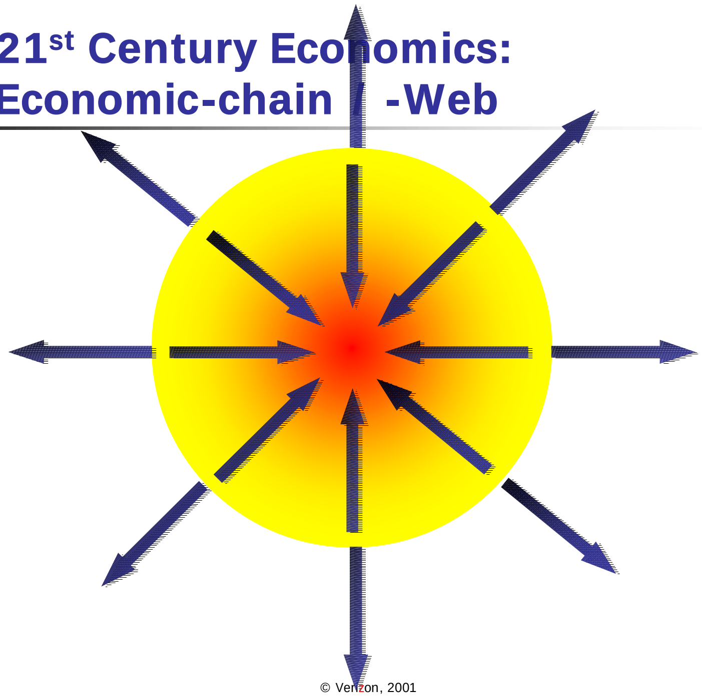
19th Century Economics: 20th Century Computing



Maximizing Opportunities: Value and Wealth Creation



21st Century Economics: Economic-chain / -Web



Next Generation Computing/Communications

- Current: Computer-native components + bridges (Internet)
  - Proprietary battles: interoperability up the wazoo + complexity
    - DSL vs. cable
    - Wireless vs. wireline
    - Operating systems
    - Java vs. .NET
    - Protocols
    - Standards: data, format, ...
- Next: Net-native Apps/eServices on computing/communications platform
  - Ubiquitous: anytime, anywhere, any device
  - Direct support of collaboration and standards-based
  - Net-native layers
    - Presentation / personalization
    - Business logic
    - Data
  - Flexibility
    - Rules and workflows
    - Organizational structure
    - Localization, personalization, regulation
- Phases [Forrester]
  - 2001-2: Apps rewritten for Net (SMEs)
  - 2003-4: Net infrastructure + enterprise apps (large enterprises)
  - 2005+: eBusiness service suites, software services

What's Going on in eBusiness?

Dot.com shakeout

B2C: E-Retail

B2B: E-Commerce / Marketplaces

Classic Bubbles

Dot.com Shakeout

- 2000 Losses
  - 210 Dot.coms (Webmergers.com)
    - 75% B2C: Boo.com, Pets.com, Etoys.com, Toysmart.com, Auctions.com, Garden.com
    - 20% B2B
    - 5% content
  - $1.5 BN in investment
  - 41,515 jobs from 496 companies (Challenger, Gray, and Christmas)
- 1Q2001 Losses
  - 147 Dot.coms (Webmergers.com); 3,100 remain 46% profitable
  - 34,043 jobs
- But
  - 20 new for each lost job (900,000 tech jobs in 2001) (U Texas)
  - High sales growth

B2C (E-Retail) Successes

Holiday 2000 E-Sales

Goldman Sachs, PC Data Online	$10.7 BN (100% increase over $5.2 in '99)
CBS News New York Times	Flat compared with 1999
Gartner	$8.4 BN (US), $19.5 BN world-wide
IDC	$12 BN
Jupiter	$10.8 BN (Nov/Dec); 36 M customers 13% of USA
eMarketer	$12.5 BN (Oct/Nov/Dec)
Yankee Group	$9 BN
ActivMedia Research LLC	$8 BN Dec

- B2C metrics on 1/00 target (vs. 99) - stronger than 11/00 expectations
  - 55-100% increase
  - Shoppers 23-30%
  - Average purchase $234 (up from $170)
  - 74% of online users

B2C Phases

- **Beginnings**: publishing (broucherware) -> transactions
- **Expansion**: stock-market funded research phase (Dot.com)
- **Consolidation**
  - "Pure plays" diminish (except Amazon.com)
  - Bricks & Mortar become multichannel retailers
    - 11 of to 15 major online brands - Nielsen/NetRatings
    - 6 of 10 leading retailers - Media Metrix
  - E-tail needs retail and *vice versa*
- **Maturation** - mass market
  - Emergence of the mass market consumer, currently < 5% (Jupiter)
  - Maturation of e-tail / retail mix and business models
    - B2C sales will slow
    - Experimentation will diminish
    - M-commerce will not take off soon
  - eCommerce brokers replace portals (e.g., mySimon) (50% of sales by 2005) [Forrester]
- **End Game** - 30-40% of all retail will be online

B2C Challenges

- Downturn
  - Economy, investment greed / classic bubble -> reduced resources / customers
  - Dot.coms and technology
- Running a (E-)Business
  - Customer satisfaction: quality of service; user experience
  - E-fulfillment
    - 67% of holiday orders not received as ordered; 12% after Xmas (Accenture)
    - FTC sued 7 companies $1.5M in 1999 and none in 2000
    - Shipping costs, Out-of-stock
  - Retain and expand customer relationships, increase online sales to justify investments (Jupiter)
- Technology
  - Immature, incomplete, non-scalable
  - Integrating legacy and heterogeneous solutions

B2B: Marketplaces / Trade Exchanges

- B2B vs. B2C
  - US: 80% eBusiness is B2B
  - Europe: almost no B2B
- Benefits
  - Cost: reduced transaction costs, lower prices, higher volumes
  - Supply chain: reduced inventory, improved shipping
  - Integrate fragmented markets
- Successes - 2000 - the Year of the B2Bs
  - Supply-chain (e.g., Wal-Mart)
  - E-finance
  - Employee portals
  - Ariba, CommerceOne becoming profitable 1/2001; Ariba 33% lay off 4/2001
  - Examples

• Electronics
• Pharmaceuticals
• Chemical

- retail, grocery stores, ... (GlobalNetXchange, Worldwide Retail Exchange)
- aerospace (MyAircraft.com, Aerospan)
- paper (PaperExchange.com)
- agriculture (ASAg.com)
- chemicals (Chemdex, ChemConnect)
- steel (eSteel)
- regional grain buyers and sellers (AgriPlace.com)
- packaged goods (Transora)
- wholesale electricity and fuel spot exchange (HoustonStreet.com)
- printing supplies (ImageX.com)
- transportation (Rightfreight.com, Freightwise)
- auto parts and materials (Automotive Network Exchange: ANX)
- energy spot exchange (CheMatch.com)
- computer parts & supplies (Dell marketplace)

B2B Phases

- **Enterprise Process Automation**
  - EDI, ERP, back-office integration, front-office integration
- **Public Marketplaces**
- **Industry Sponsored Marketplaces + MegaHubs**
  - GlobalNetXchange + 5 vendors
  - Exchange to exchange
- **Private Marketplaces**
- **Consolidation and Maturation (3+ years)**
- **End Game** - 80% of B2B trading will be online
  - Internet as a systems platform
  - eBusiness an integral part of Business

B2B Challenges

- Marketplaces have not delivered on promises
  - Few active at low levels
  - Savings to come - not yet efficient
  - Focus on governance, organizational issues
- Confusion
  - Many marketplaces - different domains, different rules
- Barriers
  - Cultural: adoption takes time
  - Technical: integration, security, catalogue management
- Business Model not right

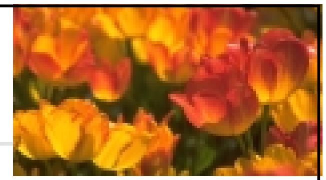
B2B Consolidation and Growth

- Estimates in 2000
  - 3,000 by 2001; 20,000 by 2003 [Net Market Makers]
  - 10,000 in 2000; 100,000 by 2001 [Gartner]
- Initially all sizes, all areas; now high volume, private players
  - Covisint (Ford / GM / Daimler Chrysler / Nissan / Renault)
    - 50,000 suppliers; 150 B US$ purchases/year/partner
    - GM's shut TradeXchange; Ford shut down AutoExchange
- Massive consolidation and trade growth B2B boom predicted for Europe, Canada, Asia, and South America
  - Global trade to reach $2.776 TR revenues by 2004 [eGlobal Report]
  - Europe: $1.7 TR by 2004 but 400 of 500 Dot.coms will fail in 2001 [Jupiter]
  - US
    - $2.1 BN in 2001 to $137.2 BN in 2005 but shakeout coming [Jupiter]
    - $433 BN (2000), $3.632 TR (2003); $8.53 TR (2005) [Gartner]

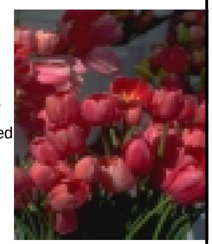
Business model not quite right

- Old Model
  - Confidential relationships with trusted partners
    - Discounts, product and service offerings; delivery, shipping, ...
  - Manual ordering, inventory management, billing, ...
- New Model
  - Public: all member vendors and purchasers
    - Publish products, services, prices, shipping, ...
  - Automated ordering, production, shipping, billing, inventory management
- Problems
  - Why give up long standing relationships
  - Why provide access to competitors
  - Traditional business principles - customer, value, profits,...
  - Integrating legacy and multiple buy and sell solutions
- New, New Model
  - Old - **Private -** model with trusted partners and new aspects where feasible
- Predictions
  - "B2B Sector ... Now Is Collapsing" [WSJ 4/4/01]; "Confidence in B2B sinks to major low" [CW 4/9/0]
  - 2-3 year evolution [Giga]
    - Orders, responses
    - Supply chain, customer service
    - Multi-channel buy and sell

Classic Bubbles



- Tulips (1634-37), Autos (1900-20s), TV ('50s), drugs ('80s), energy ('80s), PC (1982-84), ...



- Classic IT Bubbles / Sliver Bullets
  - Expert systems
  - Client/server
  - Re-engineering
  - Object-orientation
  - Re-use / Class libraries
  - Agents / AI
  - Business rules
  - The Web
  - PCs
  - COTS / ERP
  - Best of Breed
  - ...
- Characteristics
  - New business opportunities: growth focused on product performance
  - Well established principles questioned: economics, business, technology
  - Darwinian consolidation: large companies dominate focus on cost, quality, economics
    - 2,000 car companies (1900-1910) -> 100 (1929) -> 3 (1950s)
  - Long lasting innovation: products, services but mostly new models/processes
    - Ford got production right
    - Sloan (GM) got business model right
  - Hyper-growth for survivors, area by area

eBusiness: Lessons Learned

Successful E-companies

Planning an eBusiness

Measuring an eBusiness

Successful E-companies

- Schwab (b2c)
- GM (b2c)
- Citigroup (b2c)
- Amazon (b2c)
- Cisco (b2b)
- Dell (b2c)
- Travelocity (b2c)

- Sears (b2c)
- Enron (b2b)
- AOL.com (b2c)
- FedEx (b2b)
- Lucent (b2b)
- Wells Fargo (b2c)

what they're doing ...

Coordinate production with parts vendors – Computers often ship from Dell's factory 15 hours after they're ordered, down from 30 hours before the changes

Emphasizes simplicity and speed over whizzy features – Web sales are almost 30% of revenues saving $80M on agent commissions and overhead

Automated web sales & inventory system linking to suppliers, manufacturers and customers – Savings of $800M annually, or 20% of yearly profit

Development teams share ideas and documents on private web sites – Product development time has fallen 90% to just 6 months

Links mom-and-pop shops with suppliers – Stores' bottom lines up 10-15% & generate $200M yearly earnings by 2004

Online reverse auctions for basic supplies – Savings of $234M on $2.1B in purchases to date

Myplant.com e-marketplace offers everything from troubleshooting to training services – 4000 companies signed on, analysts expect $500M annual revenues by 2005

Best-In-Class Cost Savings

Cisco Systems – Current Best-in-Class Cost Savings		
Cost Savings/Avoidance	1998 (in Millions)	Percent of Revenues
Customer Care		
Headcount Avoidance	75	0.75%
Software Distribution	250	2.50%
Document Publishing	40	0.40%
Internet Commerce		
Headcount Avoidance	12	0.12%
Supply Chain Management		
Reduced Operating Costs	75	0.75%
Employee Services		
Online Hiring	8	0.08%
Productivity Increase	4	0.04%
Totals	464	4.65%
Source: Giga Information Group, data from Cisco Systems		

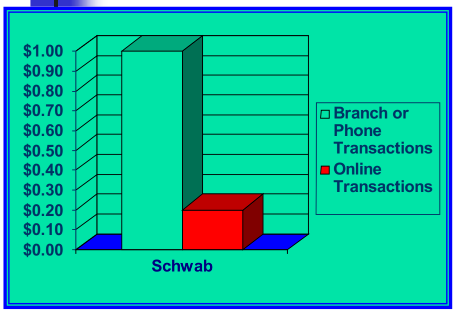
Best-in-Class Revenue Generation

	Total Revenue 2000 (billions)	Online as % of Total
Cisco	$19 Net Sales	87%
Dell	$31 Net Revenue	43%
Schwab	$5.8 Revenue	81%
Wells Fargo	$4.1 Net Income	NA
Sears	$42 Net Income	<1%
Travelocity	$1 Gross Revenue	100%

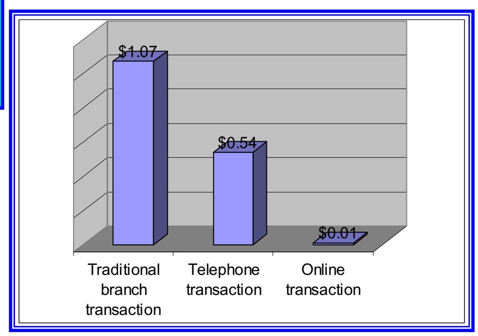
Sources: Annual Reports, Financial Statements and Jupiter Estimates

How Efficient is Efficient?

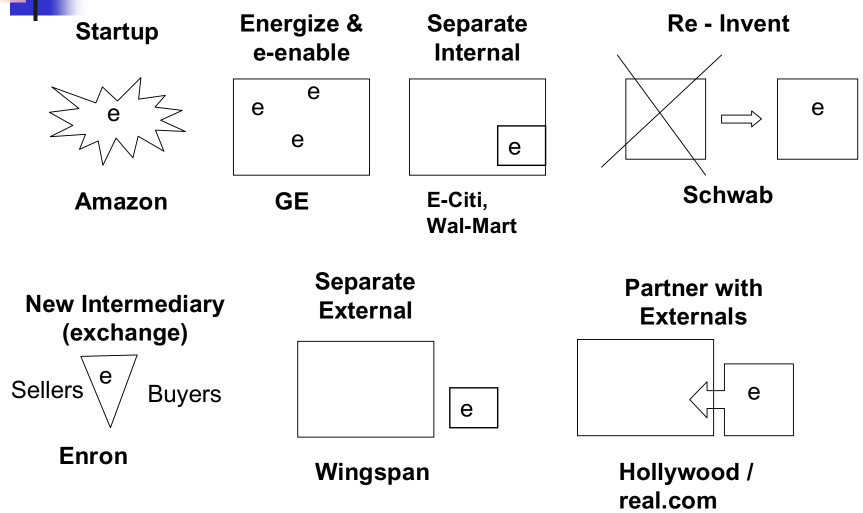
“Online transactions 80% less than what offline” *Schwab*



Estimate - online transaction costs 1% of a traditional branch transaction



eBusiness Models



Conclusions

It's gonna take time.

Conclusions: Its Just Beginning

- 2001-2002: eBusiness becomes an integral part of Business
  - eBusiness - new paradigms - multi-channel, new processes
  - Business - established paradigms - efficiency, profits, resources (Bricks not Clicks)
- 2005: Information Utility appears, Internet disappears
  - Maturity: Net-native, ubiquitous, reliable, affordable access, anywhere, anytime, any device
  - Unpredictability: Reliable information access will change everything
- Broad-based revolution: every industry at different times (5-20 years) and degrees (10% vs. 90%) based on process innovation which will depend on
  - Economics
  - Behavior (adoption, people)
  - Business (model)
  - Technology
- Classic Bubbles
  - Consolidation: the Tortoise Vs. the Hare
  - Hyper growth about to start: users (72 M in 2000), 3% -> 30% of transactions of Global 500 by 2004 [Forrester]
- Continuous evolution and change
  - Disruptive technologies and business models
  - Culture / organizational / industry re-structuring, e.g., eBusiness Networks [Forrester]
  - Law: anti-trust, intellectual property, regulations (e.g., web auto sales), privacy
  - Biggest changes will be unanticipated